



DEPARTMENT OF THE NAVY  
HEADQUARTERS UNITED STATES MARINE CORPS  
WASHINGTON, DC 20380-0001

MCO 1543.15  
IC  
30 Aug 93

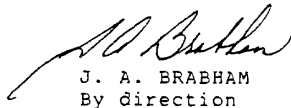
MARINE CORPS ORDER 1543.15 W/CH 1

From: Commandant of the Marine Corps  
To: Distribution List

Subj: MATERIEL FIELDING PLAN FOR THE OXYGEN TRANSFER PUMP  
SYSTEM (OTPS)

Encl: (1) Materiel Fielding Plan for the Oxygen Transfer Pump  
System (OTPS)

1. Purpose. Enclosure (1) is provided as information and instructions concerning the fielding of the OTPS.
2. Information. The mission of the Marine Corps reconnaissance underwater combat diver and airborne qualified Marine has expanded to include closed circuit underwater diving and high altitude parachute operations. This expanded operational role has forced the reconnaissance Marines to use oxygen breathing devices, such as the underwater breathing apparatus and the military freefall oxygen mask, to complete their missions. The OTPS has been fielded to satisfy the need to properly and safely maintain the equipment needed to perform closed circuit diving and high altitude jumps in an environment which is oxygen safe.
3. Action. The Commanders of each organizational element concerned shall ensure implementation of the provisions of this Order.
4. Reserve Applicability. This Order is applicable to the Marine Corps Reserve.

  
J. A. BRABHAM  
By direction

DISTRIBUTION: PCN 10201836100

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8145005 (2)  
7000099, 144/8145001 (1)  
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DEPARTMENT OF THE NAVY  
HEADQUARTERS UNITED STATES MARINE CORPS  
2 NAVY ANNEX  
WASHINGTON, DC 20380-1775

MCO 1543.15 Ch 1  
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9 May 94

MARINE CORPS ORDER 1543.15 CH 1

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To: Distribution List

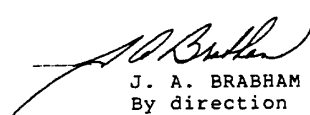
Subj: MATERIEL FIELDING PLAN FOR THE OXYGEN TRANSFER PUMP  
SYSTEM (OTPS)

1. Purpose. To direct pen changes to the basic Order.
2. Action

a. Enclosure (1), page 3, paragraph 2c, at the end of the paragraph add the following sentence: "The OTPS will be required to operate the Transportable Recompression Chamber System (TAMCN C4560) which will be housed in two Knockdown MCESS (TAMCN C6115) connected with a Complexing Kit (TAMCN C4432) and a Joining Corridor (TAMCN C5105)."

b. Enclosure (a), page 6, paragraph 3f, change third sentence to read "It includes a component parts list and repair parts list for the MCESS and all oxygen transferring components of the OTPS."

3. Filing Instructions. File this Change transmittal immediately behind the signature page of the basic Order

  
J. A. BRABHAM  
By direction

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MATERIEL FIELDING PLAN  
FOR THE  
OXYGEN TRANSFER PUMP SYSTEM (OTPS)

1. Introduction

a. Source of Requirement. Commanding General, Marine Corps Combat Development Command message 252000Z Jul 90 identified an oxygen safe room as an equipment requirement for the Special Operational Capable units.

b. Points of Contact

Command /Telephone

PROJECT OFFICER  
DIVING EQUIPMENT  
MARCORSYSCOM IC  
QUANTICO VA 22134-5010  
DSN: 278-2914  
COML: (703) 640-2914

ILS OFFICER  
DIVING EQUIPMENT  
MARCORSYSCOM IC  
QUANTICO VA 22134-5010  
DSN: 278-2912  
COML: (703) 640-2912

INVENTORY MANAGER  
DIVING EQUIPMENT  
MARCORLOGBASES  
CODE 835-1  
ALBANY GA 31704-5000  
DSN: 567-6534  
COML: (912) 439-6534

EQUIPMENT SPECIALIST  
DIVING EQUIPMENT  
MARCORLOGBASES  
CODE 835-1  
ALBANY GA 31704-5000  
DSN: 567-6534  
COML: (912) 439-6534

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c. Fielding Methodology

(1) General Fielding Plan. The OTPS will be fielded vertically in order to give the units with the highest priority, the item first. Appendix A provides the schedule in which the OTPS will be delivered. Appendix B provides a Schedule of Events.

(2) Method of Fielding. An initial issue of the OTPS will be provided by Marine Corps System Command in order to bring the units up to the Table of Equipment quantities as shown in appendix A.

d. Replaced Systems/Equipment. N/A

2. System Description

a. Administrative Information

- (1) Nomenclature. Oxygen Transfer Pump System (OTPS)
- (2) TAMCN. C2276IIE
- (3) Stores Account Code (SAC). 3
- (4) NSN. 3694-01-369-1294
- (5) Unit of Issue. Each
- (6) Unit Cost. \$175,000
- (7) Support Cost. N/A
- (8) Petroleum, Oil, and Lubricants. N/A
- (9) Equipment Density. Normal
- (10) Readiness Reporting. Yes
- (11) Equipment Identification Number. 09782A

b. Physical Characteristics

	<u>Operational Configuration</u>	<u>Storage/Shipping Configuration</u>
(1) <u>Length</u>	240 in	240 in
(2) <u>Width</u>	96 in	96 in

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(3) <u>Height</u>	96 in	96 in
(4) <u>Square</u>	160 sq ft	160 sq ft
(5) <u>Cube</u>	1280 cu ft	1280 cu ft
(6) <u>Weight</u>	5,500 lbs (est.)	5,500 lbs (est.)
(7) <u>Stowage</u>	cubic	cubic
(8) <u>Power Requirements</u>	120/208 Volt AC, 3 Phase, 60Hz, 60 Amp Max.	

c. Operational Characteristics. The OTPS consists of various oxygen transferring items within a proper internally configured Marine Corps Expeditionary Shelter System (MCESS). Properly configured, the OTPS gives the using unit the ability to safely and effectively maintain all of its closed circuit diving and military freefall equipment in an oxygen safe area. The OTPS is designed to be used both on or off deployments. The OTPS can be operated in several different mission scenarios ranging from expeditionary, shipboard, or commercial and in various climates, from very cold to very warm. The OPTS will be required to operate the Transportable Recompression Chamber System (TAMCN C4560) which will be housed in two Knockdown MCESS (TAMCN C6115) connected with a Complexing Kit (TAMCN C4432) and a Joining Corridor (TAMCN C5105).

d. Associated/Related Systems/Equipment The OTPS will interface with the Air Conditioner, Marine Corps Standard, Vertical, 60 hertz, 36,000 British Thermal Units (Table of Authorized Materiel Control Number (TAMCN) B0005) in order to be properly cooled.

### 3. Logistics Support

a. Maintenance Support. The OTPS requires organizational, intermediate, and limited depot level maintenance. The owning unit will provide both organizational (1st and 2nd echelon) and intermediate (3rd and 4th echelon) level maintenance on the oxygen transferring equipment, with the exception of any calibration requirements. All calibration requirements are to be completed by a Navy calibration facility designed to handle oxygen transferring equipment. The owning unit will also complete the Organizational level maintenance on the MCESS portion of the OTPS. The FSSG will provide any intermediate level maintenance needed on the MCESS. Coastal Systems Station, Panama City, FL will act as the depot for specific oxygen transferring items within the OTPS. See appendix C for the Maintenance Plan.

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b. Contractor Support Requirements

- (1) Depot Support. N/A
- (2) Interim Contractor Support. N/A

c. Manpower, Personnel, and Training

(1) Personnel Requirements. Support for the OTPS should not impact personnel. The current T/O will be used to support and maintain the OTPS. A Combat Diver, Military Occupational Specialty (MOS) 8653 or Combat Diver, jump qualified (MOS 8654) should be assigned to operate the OTPS and maintain the OTPS through 4th echelon maintenance after completing the appropriate training.

(2) Training Requirements

(a) Operator Training. In order to become certified to operate the OTPS, a Marine (MOS 8653 or 8654) must complete one of the following:

1 Attend the U.S. Navy Combatant Dive School in Panama City, FL and receive the OTPS portion of the school.

2 Attend a New Equipment Training Team (NETT) course. A one time NETT will be provided at all of the major commands which will be receiving an OTPS. The NETT is designed to train already qualified divers and jumpers who currently work in reconnaissance units in the FMF (active and reserve).

(b) Maintainer Training. The Combatant Dive School will also instruct Marines to safely complete any 1st - 4th echelon maintenance tasks on the oxygen transferring equipment. The NETT will also instruct Marines (MOS 8653 and 8654) to perform 1st - 4th echelon maintenance on the all of the oxygen transferring equipment.

(c) Certification. Marines who complete the necessary training will be certified to operate and maintain the OTPS. Although a "licensed" will not be issued, the appropriate entries to Officer Qualification Records/Service Record Books should be made. A list of certified operators and maintainers should also be posted on the outside of the OTPS, thus restricting access, maintenance and operation of the OTPS to only certified personnel.

(3) Training Support Items. The Combatant Dive School will have an operational OTPS (minus the MCESS) to aid in the

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instruction. The NETT's will use the owning unit's OTPS to assist in its instruction.

d. Supply Support

(1) Provisioning. All the provisioning for the OTPS is being completed by either CSS, Panama City, FL or Marine Corps Logistics Bases (MARCORLOGBASES), Albany, GA.

(2) Replenishment. Normal supply procedures should be used when requisitioning a local Navy National Stock Number (NSN) listed in the stock lists. Requesting units should use Requisition Identification Code P87 and the address provided below. Other items should be requisitioned from the listed source of supply or by non-system procedures, as necessary.

Coastal Systems Station //P87//  
Code N2530  
Panama City, Florida

e. Support Equipment

(1) Special Tools. N/A

(2) Common Tools

(a) All the tools needed to support the interior of the OTPS are found in one of the following tool sets:

<u>Nomenclature</u>	<u>TAMCN</u>
Tool Set, Shop, Oxygen Equipment	K4994
Underwater Breathing Apparatus	
Deployable Tool Set	K4999

(b) Any tools needed to maintain the exterior components of the OTPS, to include the flask rack assembly, can be found in one of the following tool kits:

<u>Nomenclature</u>	<u>TAMCN</u>
Tool Kit, Common Number 1	C9672
Tool Kit, Common Number 2	C9673
Tool Kit, General Mechanics	C6490

(3) Special Purpose Test Equipment (SPTE). All the SPTE needed to support the OTPS is in the Tool Set, Shop, Oxygen, TAMCN K4994 and is also identified below. Any of the items

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needing calibration must be calibrated by an appropriate Navy calibration facility.

<u>Nomenclature</u>	<u>NSN</u>	<u>Manufacturers' Part Number</u>
Light, Diagnostic-Examination	6530-00-480-8286	National Draegar (ND) U11538
Precision Metering Device Rod, Break, Gauge, Alignment T-Connection Piece	4220-01-247-9688	ND R32271
Test Assembly, MPV	N/A	ND 4050379
Test Assembly, Pressure	4220-01-249-0704	N/A
Test Assembly, Regulator Pressure	N/A	ND 4054115
Test Kit, Bellows	N/A	ND 4054156
Test Kit, Bag, Breathing	4220-01-247-9697	N/A
Test Set, Valve, Safe Ultrasonic Cleaning System	4220-01-247-9695	Bronson 952-514

(4) General Purpose Test Equipment. N/A

(5) Test Program Sets. N/A

(6) Other Support Equipment. N/A

f. Technical Publications. The OTPS is supported by TM 09782A-14&P/1, publication control number (PCN) 18409782000. TM 09782A-14&P is an operation and maintenance manual for the oxygen transferring portion of the OTPS. It includes a component parts list and repair parts list for the MCESS and all oxygen transferring components of the OTPS. Owning units should refer to TM 5411-14/1, PCN 18204796000, concerning the proper operation and maintenance of the MCESS. In addition, owning units should refer to SL-4 09782A for the list of repair parts on the MCESS which are unique to the OTPS. A set of Planned Maintenance System Maintenance Requirement Cards located in TM 09782A-14&P/2, PCN 18409782100 is also available to assist owning units with their the prescribed Navy maintenance tasks.

g. Computer Resources Support. N/A

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h. Facilities

(1) Existing Facilities. The OTPS needs either commercial power or a Mobile Electric Power generator in the form of 120/208 Volt AC, 3 Phase, 60Hz, 60 Amp Max. electric power.

(2) New Facilities. N/A

(3) Interim Facilities. N/A

i. Packaging, Handling, Storage, and Transportation

(1) Packaging. There are no special packaging procedures for the OTPS.

(2) Handling. The transporting of filled "K" bottles, UBA bottles, High Altitude Low Opening bottles, and the flask rack bottles in and around the OTPS must be handled with care. Any incidental hard contact with a bottle's valve and another object could cause a rupture to a valve and the rapid release of either compressed air or oxygen.

(3) Storage. The majority of the OTPS can be stored out of doors at all times. The flask rack assembly should be stored inside on the aisle of the OTPS during extended non-operational times. The system should be purged so it is free from any gases and all fittings capped or sealed when the OTPS is not in use.

(4) Transportability. The compressed air and oxygen cylinders must meet the Department of Transportation shipping requirements prior to embarkation. All of the items in the OTPS should be properly placed in their appropriate drawer. Air or gases need to completely purged from the system and the flask rack assembly properly stored on the aisle of the OTPS prior to transportation.

j. Warranties. The OTPS does not meet the dollar threshold for a warranty.

4. Actions Required To Place Equipment In Service

a. Gaining Commands

(1) Actions to Place Items In Service

(a) Place all OTPS's on administrative deadline until all of the other actions in this paragraph are completed.

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(b) Ensure all the appropriate technical publications are on hand.

(c) Ensure the Tool Set, Shop, Oxygen Equipment, TAMCN K4994 and the UBA Deployable Tool Set, TAMCN K4999 are on hand prior to performing maintenance on the OTPS (All the units which rate the OTPS already rate both tool sets).

(d) Ensure MOS 8653/8654 personnel are available and that they have attended the necessary training prior to operating or maintaining the OTPS.

(e) Locate a source of aviators grade oxygen in "K" bottles from the General Services Administration schedule or another source of supply.

(f) Request approval to place the OTPS's into service from COMMARFORLANT/PAC or CG, MARRESFOR, as appropriate.

(2) Materiel Defects Reporting. If any of the contents of the OTPS arrive damaged or missing, a [SF 368](#) Quality Deficiency Report (QDR) should be submitted to COMMARCORLOGBASES, (808-1), Albany, GA. Additionally, if any part of the OTPS becomes defective from other than normal use, a QDR should also be submitted.

b. COMMARCORLOGBASES. Albany, GA. Assist in the life cycle management of the OTPS.

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LIST OF ALLOWANCES AND DELIVERY SCHEDULE

ACTIVE FORCES

T/E	Unit	No.	Unit	Planned			
No.	Title	Units	Allow	FY 93	Otr		
N4718	For Recon Co, 2d SRIG	1	3	3			
N1422	Recon Co, Recon Bn, 2d MarDiv	2	1	2			
N4618	For Recon Co, 1st SRIG	1	3		3		
N1422	Recon Co, 1st Inf Regt, 1st MarDiv	1	1		1		
N1422	Recon Co, 5th Inf Regt, 1st MarDiv	1	1		1		
N4818	For Recon Co, 3d SRIG	1	2			2	
N1432	Recon Co, 4th Inf Regt, 3d MarDiv	1	1			1	
N1432	Recon Co, 9th Inf Regt, 3d MarDiv	1	1			1	

RESERVE FORCES

T/E	Unit	No.	Unit	Planned			
No.	Title	Units	Allow	FY 93	Otr		
M4623	4th For Recon Co (-), MARRESFOR	1	1			1	
M4623	DET, 4th For Recon Co, MARRESFOR	1	1			1	
M4623	3d For Recon Co, MARRESFOR	1	1			1	

Total: 17

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SCHEDULE OF EVENTS

Began Fielding	2nd Qtr FY 93
Initiating Service Date	2nd Qtr FY 93
Initial Operational Capability	2nd Qtr FY 93
Full Operational Capability	4th Qtr FY 93

Appendix B to  
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## MAINTENANCE PLAN

### 1. General Considerations

a. Design Description. The Oxygen Transfer Pump System (OTPS) will provide the closed circuit diving and military freefall (MFF) parachuting communities with the capability to re-charge oxygen cylinders (LAR V oxygen cylinders) used with the LAR V Underwater Breathing Apparatus (UBA) and the MFF bailout bottles. The OTPS allows users to pressurize UBA oxygen cylinders to 3,000 pounds per square inch (psi) and MFF bailout bottles to 1,800 psi. The OTPS consists of the following major components: Flask Rack Assembly, Regulator/Filter Panel, Oxygen Booster Pump, Oxygen Supply System, Charging Manifold, Oxygen Monitor, and Marine Corps Expeditionary Shelter System (MCESS). The OTPS is housed in a MCESS which acts as an oxygen safe room.

(1) Flask Rack Assembly. The flask rack assembly consists of three racks with three KEVLAR composite air flasks on each rack. Each flask has a length of 30.55 inches, a diameter of 10.22 inches, and a weight of 29.5 pounds (empty). Each flask has a floodable volume of 0.93 cubic feet, a service pressure of 3,000 pounds per square inch gauged, and an air capacity of 188 standard cubic feet. Each air flask is protected from over-pressure by a frangible disk safety device. The disks rupture at 4,500 psi, venting the flasks' high pressure (hp) air to the atmosphere. Standard scuba tanks may serve as an alternate source of air to drive the oxygen booster pump.

(2) Regulator/Filter Panel. The regulator/filter panel assembly receives hp air (up to 3,000 psi) from the flask rack assembly and reduces it to low pressure (lp) air (approximately 125 psi). The air is then filtered through a moisture separator and supplied to the oxygen booster pump as drive air.

(3) Oxygen Booster Pump. The oxygen booster pump uses a modified Haskel "Oil Free" gas booster compressor. It is an air driven non-lubricated, reciprocating piston type gas compressor. The air drive piston is automatically cycled by a non-detented, unbalanced air valve spool that is alternately pressurized and vented by the pilot air system. This drive is directly connected to the booster section piston which is designed to run dry without lubrication to supply gas free of hydrocarbon contamination to either LAR V oxygen cylinders or MFF bailout

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bottles. The pistons are driven by 1p air that is supplied by the hp flask rack assembly and regulated to low pressure (approximately 125 psi) at the regulator/filter rack assembly.

(4) Oxygen Supply System. Oxygen is supplied from a Department of Transportation cylinder (K bottle) or a high pressurized aviators oxygen cylinder. The charging hose and gage assembly connects the Oxygen Booster Pump to the oxygen supply.

(5) Charging Manifold. The charging manifold provides external connectors, control valves, charging whips, pressure gauge, and relief valves for the safe transfer of oxygen. The system receives oxygen from the oxygen booster pump and charges up to six UBA oxygen cylinders (LAR V bottles) or MFF bailout oxygen cylinders.

(6) Oxygen Analyzer. The Analox 1,000 Oxygen Analyzer is an electronic measuring instrument that senses and displays the percentage of oxygen in the MCESS. The measured value of oxygen is displayed on a 5-digit red LED and may be configured to read 0-100% or 0-1999.9 millibar pressure of oxygen. If a high oxygen concentration is detected, adjustable audio and visual alarms will activate and a flapper valve will open which converts the air conditioning system from a closed circuit system to an open circuit system.

(7) MCESS. The MCESS acts as the oxygen safe room which is needed to complete the OTPS as a self-sufficient system. It is deployable and will be used as a repair facility for all closed circuit dive systems. It contains all tools necessary for repair of closed circuit dive systems.

b. Maintenance Plan Summary. Maintenance on the OTPS will require organizational level (1st and 2nd echelon), intermediate level (3rd and 4th echelon), and depot level (5th echelon) maintenance. Both organizational and intermediate levels of maintenance will be performed by the owning units in accordance with the U.S. Navy Planned Maintenance System and the Marine Corps Integrated Maintenance Management System. Specific maintenance levels will be determined by the Source, Maintenance and Recoverability (SM&R) codes assigned.

(1) Organizational Level Maintenance (1st and 2nd echelon). First echelon maintenance will be conducted by the owning/using unit. It includes the proper care, cleaning, storage, operation, and operational checks prescribed by appropriate user manuals and TM. Second echelon maintenance will be performed by Military Occupational Specialty (MOS) 8653 or MOS

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8654 personnel in the using unit who have completed OTPS training. Second echelon personnel will clean and inspect the OTPS, replace flask rack labels as necessary, and perform the majority of the required preventive maintenance tasks.

(2) Intermediate Level Maintenance (3rd and 4th echelon). Third and fourth echelon maintenance will be performed by maintenance personnel in the owning unit who have completed OTPS training. Maintenance actions involving oxygen service will be performed inside the MCESS. Intermediate maintenance will include, but not be limited to, removing and replacing component items and performing comparison testing on gauges and indicators that are not used for oxygen service. Any gauges or indicators which require calibration will be given to an appropriate Navy calibration facility for maintenance.

(3) Depot Level Maintenance (5th echelon). Any maintenance action which cannot be performed at the intermediate maintenance level, including all maintenance actions which require an oxygen clean room and all maintenance on the oxygen booster pump, should be shipped to Coastal Systems Station (CSS), Panama City, FL. Pipe assemblies and valves used in oxygen service are SM&R coded as special handling items and are examples of items which should be sent to CSS, Panama City for maintenance. Gauges used in oxygen service are also coded as special handling items since they should only be disassembled in an oxygen clean room.

Requests for disposition instructions should be requested from the Commander, Marine Corps Logistics Bases, Albany, GA (Code 835-1) if maintenance is needed beyond the capability of the owning unit as specified in the TM. An information copy of the message should be sent Coastal Systems Station Diving Depot (CSSDD) //P87// so they can begin to prepare a replacement item for shipment prior to receiving the defective item. CSSDD will act as the Depot Maintenance Activity for the OTPS. Owning units should notify CSSDD 30 days prior to expiration of an oxygen gauge calibration date. CSSDD will ship calibrated-gauges to the unit on an exchange basis.

(4) Reliability, Availability, and Maintainability Parameters

(a) Reliability. Mean Time Between Failures = 500  
hours

(b) Availability. Operational Availability = 0.95

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(c) Maintainability. Mean Time To Repair = 30 minutes

(5) Manpower Skills. There is no new manpower or new MOS's anticipated to maintain the OTPS. The operator and maintainer for the OTPS must be qualified as MOS 8653 (Reconnaissance Man Scuba Qualified), or MOS 8654 (Reconnaissance Man Parachute/Scuba Qualified), and be OTPS certified. OTPS certification is acquired by either attending a New Equipment Training Team (NETT) course or by completing the Navy Combatant Dive School. (OTPS training is currently being incorporated into combatant dive school curriculum.)

(6) Training Requirements. Operator and maintenance training for the OTPS will be satisfied by attending either the Navy Dive School OTPS training course or attending the NETT course.

(a) Training Courses. An 8-hour combined operator/maintainer course was given at the Navy Combatant Dive School on 1 December 1992. The course trained and certified Marines to operate and maintain the OTPS. A NETT will be provided at each of the major commands to certify all other MOS 8653 and MOS 8654 personnel to operate and maintain the OTPS up to the fourth echelon. Skill progression training and professional military education are not needed for the fielding of the OTPS.

(b) Training Sites. The Navy Combatant Dive School will conduct a training course for owning units of the OTPS during the diving and salvage course at the Navy Diving and Salvage Training Center. One 8-hour session will be required. CSSDD will staff the NETT's and will consist of two 8-hour sessions.

(c) Training Schedule. Operator/Maintainer Training will be conducted by a NETT concurrently with the initial fielding of the OTPS. First and second echelon training will be provided during each of the Diving and Salvage courses. One 8-hour session will be required.

(d) Requirements to Modify Existing Training. The fielding of the OTPS will require NETT training which will be conducted by the CSSDD for the Marine Corps.

(e) Training Manuals and Technical Publications. TM 09782A-14&P/1, Operations and Maintenance Manual with Repair Parts List, Oxygen Transfer Pump System (Technical Manual, 1st

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through 4th echelon with parts list)); TN 4700-15/I, Equipment and Record Procedures; and TN 09782A-14/2 Planned Maintenance Systems, Maintenance Requirement Cards, for the Oxygen Transfer Pump System will be available to assist operators and maintainers.

(7) Facilities. The OTPS is a self-contained facility, therefore no other facilities are required for any maintenance or training requirements.

(a) Site Selection. A level surface, preferably paved asphalt or concrete is the desired surface for installation and operation of the OTPS.

1 Area Requirements. As a general rule, the area should extend 30 feet on all sides of the shelter. If the shelter is to be erected at a deployment site, a larger area may be required.

2 Topographical Considerations. The surface must be fairly flat. Good drainage is imperative, therefore a gently sloping area is preferred. Low lying areas which may accumulate drainage water should be avoided.

(b) Site Preparation. For level surfaces, remove all debris which may be protruding from the ground. The ground on which the shelter will be placed must be free of trees, stumps, saplings and bushes, and all holes and depressions filled. If the site is sandy, rake and level the area and place heavy planking under the shelter to help resist erosion. Use marshy sites-only when it is impossible to choose other types of terrain. Select a site on the highest, driest portion of the marshy area. Minor grading may be necessary to increase the height of the site. Adding dirt, boards, or lumber can also be used to increase the height of the site.

(c) Power Requirements. Power requirement for the MCESS are: 120/208 Volt AC, 3 Phase, 60Hz, 60 Amp Max.

c. Plan Rationale. The OTPS was designed using high reliability components already proven in a military environment. Rationale for the identification of repairable items, level of repair decisions, and support factors were based on historical data from similar existing equipments and recommendations from maintenance support personnel from CSSDD and Marine Corps Systems Command.

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d. Tools and Test Equipment. No special test equipment is required for OTPS maintenance. The following tool sets are used in conjunction with the OTPS:

(1) Tool set to be located within the MCESS and used on non-OTPS components within the shelter - issued with OTPS.

(2) Tool set to be located without the MCESS and used for maintenance of the flask rack assembly - consists of common tools; will already exist within the unit. (i.e. general mechanics tool kit or common number one or two tool kits)

(3) SL-3-09658A, Components List for Tool Set, Shop, Oxygen Equipment (Closed Circuit Diving) & Military Freefall Parachuting Equipment - issued with MCESS to support 1st through 4th echelon maintenance will stay within the shelter.

(4) SL-3-09659A, Components List for Tool Set, Deployable, Oxygen Equipment (Closed Circuit Diving) - issued with MCESS to support 1st and 2nd echelon maintenance. It will be kept in the shelter when the unit is not deployed, but can be removed from the shelter and deployed to an area unit that has an oxygen safe room or an oxygen clean room (i.e. shipboard).

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